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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/576,498	04/20/2006	Masahiko Hamanaka	01070078AA	6288

30743 7590 12/29/2008

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EXAMINER	
RUSH, ERIC	

ART UNIT	PAPER NUMBER
2624	

MAIL DATE	DELIVERY MODE
12/29/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/576,498	HAMANAKA, MASAHIKO	
	Examiner	Art Unit	
	ERIC RUSH	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 August 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 April 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/29/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This action is responsive to the arguments and remarks received on 29 August 2008. Claims 1 – 27 are currently pending.

Claim Objections

2. Claim 23 is objected to because of the following informalities: Claim 23 depends from claim 10 but it appears to depend from claim 19. The Examiner will treat claim 23 as depending from claim 19 for the purposes of examination. Appropriate correction is required.

Claim Rejections - 35 USC § 101

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. The rejections to claims 19 – 27 under 35 U.S.C. 101 have been reconsidered and withdrawn in view of the amendment and remarks received on 29 August 2008.

Claim Rejections - 35 USC § 103

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 1-4, 7-13, 16-22 and 25- 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dionysian U.S. Patent No. 6,002,782 in view of Kawakami et al. U.S. Publication No. 2001/0020946 A1.

- With regards to claims 1, 10, and 19, Dionysian teaches an image comparison system, method and program comprising: means for inputting three-dimensional data of an object; (Dionysian, Figure 1, Column 3 Lines 20 - 35) reference image storing means for storing a reference image of a least one reference object; (Dionysian, Column 4 Lines 22 – 26) pose candidate deciding means for generating a plurality of pose candidates; (Dionysian, Column 4 Lines 29 - 58, Dionysian teaches transforming the three-dimensional model in order to coincide the model with the viewing direction of the access image) comparison image generating means for generating, for the reference image for the at least one object, a comparison image close to the reference image, said generating including projecting the three-dimensional data onto a two-dimensional image in accordance with each of the plurality of pose candidates to generate a plurality of comparison images and calculating, for each of the plurality of comparison images, the minimum distance between the comparison image and the reference image and selecting, as the comparison image close to the reference image, the comparison image having the smallest

minimum distance; (Dionysian, Column 6 Lines 5 - 27) and image comparing means for performing comparison on the basis of one of a distance value and a similarity degree between the reference image and the generated comparison image and, based on the comparison, identifying whether a match exists between the generated comparison image and the reference image. (Dionysian, Column 6 Lines 28 - 58) Dionysian fails to teach generating a plurality of comparison images and calculating, for each of the plurality of comparison images, the minimum distance between the comparison image and the reference image and selecting, as the comparison image close to the reference image, the comparison image having the smallest minimum distance. Kawakami et al. teach generating a plurality of comparison images and calculating, for each of the plurality of comparison images, the minimum distance between the comparison image and the reference image and selecting, as the comparison image close to the reference image, the comparison image having the smallest minimum distance. (Kawakami et al., Paragraphs 0073 - 0077, 0082, and 0084 - 0088) It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Dionysian with the teachings of Kawakami et al. This modification would have been prompted because Dionysian teaches a substantially similar approach to solving the same problem as

Kawakami et al. but merely fails to use an iterative approach. One would have been motivated to make such a modification in order to increase the accuracy of the system because of the increased ability to adjust the pose of the comparison image to the most accurate representation by using the iterative approach for reducing the misalignment.

- With regards to claims 2, 11, and 20, Dionysian in view of Kawakami et al. teach an image comparison system, method and program according to claims 1, 10, and 19, respectively, characterized in that said image comparing means comprises: calculating means for calculating one of the distance value and the similarity degree between the reference image and the comparison image; (Dionysian, Column 6 Lines 23 – 67, a correlation value is obtained, i.e. similarity degree) selecting means for selecting one of a minimum distance value which is a smallest distance value and a maximum similarity degree which is a largest similarity degree; (Dionysian, Column 6 Lines 23 – 67 and Column 7 Line 64 - Column 8 Line 4) and comparing means for performing comparison on the basis of one of a result of comparison between the minimum distance value and a threshold value and a result of comparison between the maximum similarity degree and a threshold value.

(Dionysian, Column 6 Lines 23 – 67, the correlation value must exceed a threshold)

- With regards to claims 3, 12, and 21, Dionysian in view of Kawakami et al. teach an image comparison system, method and program according to claims 1, 10, and 19, respectively, characterized in that said comparison image generating means generates a comparison image close to each reference image, (Dionysian, Column 6 Lines 5 - 27) and said image comparing means comprises: calculating means for calculating one of a distance value and a similarity degree between each reference image and the comparison image; (Dionysian, Column 6 Lines 23 – 67 and Column 7 Line 64 - Column 8 Line 4) selecting means for selecting one of a minimum distance value which is a smallest distance value and a maximum similarity degree which is a largest similarity degree for each reference image; (Dionysian, Column 6 Lines 23 – 67 and Column 7 Line 64 - Column 8 Line 4) and comparing means for outputting, as a comparison result, one of a reference image including a smallest minimum distance value which is a smallest one of minimum distance values and a reference image including a largest maximum similarity degree which is a largest one of maximum similarity degrees. (Dionysian, Column 6 Lines 23 – 67)

- With regards to claims 4, 13, and 22, Dionysian in view of Kawakami et al. teach an image comparison system, method and program according to claims 1, 10, and 19, respectively. Dionysian fails to teach a system, method and program further characterized by further comprising: reference correction coefficient storing means for storing a correction coefficient corresponding to the reference image; and correcting means for correcting one of the minimum distance value and the maximum similarity degree by using the correction coefficient. Kawakami et al. teach a system, method and program further characterized by further comprising: reference correction coefficient storing means for storing a correction coefficient corresponding to the reference image; (Kawakami et al., Fig. 1, Page 6 Paragraphs 0080 - 0087) and correcting means for correcting one of the minimum distance value and the maximum similarity degree by using the correction coefficient. (Kawakami et al., Page 6 Paragraphs 0080 – 0087) It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Dionysian in view of Kawakami et al. with further teachings of Kawakami et al. This modification would have been prompted in order to account for variations in various conditions between the reference and comparison images.

- With regards to claims 7, 16, and 25, Dionysian in view of Kawakami et al. teach an image comparison system, method and program according to claims 1, 10, and 19, respectively. Dionysian fails to teach a system, method and program characterized by further comprising: representative three-dimensional object model storing means for storing representative ones of three-dimensional object models as representative three-dimensional object models; group storing means for storing related information of the representative three-dimensional object models and reference images; three-dimensional comparing means for comparing the input three-dimensional data with the representative three-dimensional object models, and selecting a representative three-dimensional object model similar to the three-dimensional data; and reference image selecting means for selecting a reference image corresponding to the selected representative three-dimensional object model by referring to the related information, wherein said image comparing means compares the selected reference image with the input three-dimensional data. Kawakami et al. teach a system, method and program characterized by further comprising: representative three-dimensional object model storing means for storing representative ones of three-dimensional object models as representative three-dimensional object models; (Kawakami et al.,

Page 2 Paragraph 0033) group storing means for storing related information of the representative three-dimensional object models and reference images; (Kawakami et al., Page 2 Paragraph 0033, Page 3 Paragraphs 0045 - 0048) three-dimensional comparing means for comparing the input three-dimensional data with the representative three-dimensional object models, (Kawakami et al., Page 3 Paragraphs 0040 - 0042) and selecting a representative three-dimensional object model similar to the three-dimensional data; (Kawakami et al., Page 3 Paragraphs 0040 - 0042) and reference image selecting means for selecting a reference image corresponding to the selected representative three-dimensional object model by referring to the related information, (Kawakami et al., Page 3 Paragraphs 0040 - 0042) wherein said image comparing means compares the selected reference image with the input three-dimensional data. (Kawakami et al., Fig. 1, Page 2 Paragraph 0033, Page 3 Paragraphs 0045 - 0048) It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Dionysian in view of Kawakami et al. with further teachings of Kawakami et al. This modification would have been prompted in order to more accurately compare reference data with inputted data of the same orientation whilst taking into account numerous variations between the two inputs.

- With regards to claims 8, 17, and 26, Dionysian in view of Kawakami et al. teach an image comparison system, method and program according to claims 1, 10, and 19, respectively. Dionysian fails to teach a system, method and program characterized by further comprising: representative image storing means for storing representative ones of images as representative images; group storing means for storing related information of the representative images and reference images; representative image selecting means for comparing the input three-dimensional data with the representative images, and selecting a representative image similar to the three-dimensional data; and reference image selecting means for selecting a reference image corresponding to the selected representative image by referring to the related information, wherein said image comparing means compares the selected reference image with the input three-dimensional data. Kawakami et al. teach a system, method and program characterized by further comprising: representative image storing means for storing representative ones of images as representative images; (Kawakami et al., Fig. 1, Page 3 Paragraphs 0041 - 0045) group storing means for storing related information of the representative images and reference images; (Kawakami et al., Page 3 Paragraphs 0046 - 0048) representative image selecting means for comparing the input three-dimensional data with the

representative images, (Kawakami et al., Page 7 Paragraphs 0102 -0103) and selecting a representative image similar to the three-dimensional data; (Kawakami et al., Page 7 Paragraphs 0102 - 0103) and reference image selecting means for selecting a reference image corresponding to the selected representative image by referring to the related information, (Kawakami et al., Fig. 1, Page 2 Paragraph 0033, Page 3 Paragraphs 0040 - 0048) wherein said image comparing means compares the selected reference image with the input three-dimensional data. (Kawakami et al., Page 7 Paragraphs 0102 - 0103) It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Dionysian in view of Kawakami et al. with further teachings of Kawakami et al. This modification would have been prompted in order to more accurately compare reference data with inputted data of the same orientation whilst taking into account numerous variations between the two inputs.

- With regards to claims 9, 18 and 27, Dionysian in view of Kawakami et al. teach an image comparison system, method and program according to claims 4, 13, and 22, respectively. Dionysian fails to teach a system, method and program characterized in that the correction coefficient is determined on the basis of at least one of a distance value and a similarity degree between a

representative three-dimensional object model and the reference image. Kawakami et al. teach a system, method and program characterized in that the correction coefficient is determined on the basis of at least one of a distance value and a similarity degree between a representative three-dimensional object model and the reference image. (Kawakami et al., Page 6 Paragraphs 0080 - 0087)

7. Claims 5-6, 14-15, and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dionysian U.S. Patent No. 6,002,782 in view of Kawakami et al. U.S. Publication No. 2001-0020946 A1 as applied to claims 1, 10, 19 above, and further in view of Roy et al. U.S. Patent No. 6,956,569

- With regards to claims 5, 14, and 23, Dionysian in view of Kawakami et al. teach an image comparison system, method and program according to claims 1, 10, and 19, respectively. Dionysian fails to teach a system, method and program further characterized by further comprising reference weighting coefficient storing means for storing a weighting coefficient corresponding to the reference image, said image comparing means comprising calculating means for calculating one of the distance value and the similarity degree between the reference image and the comparison image by using the weighting coefficient corresponding to the reference image. Roy

et al. teach a system, method and program further characterized by further comprising reference weighting coefficient storing means for storing a weighting coefficient corresponding to the reference image, (Roy et al., Column 6 Lines 5 – 26 and Lines 34—60, Column 9 Line 64 – Column 10 Line 58) said image comparing means comprising calculating means for calculating one of the distance value and the similarity degree between the reference image and the comparison image by using the weighting coefficient corresponding to the reference image. (Roy et al., Column 10 Line 41 – Column 11 Line 12) It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Dionysian in view of Kawakami et al. with the teachings of Roy et al. This modification would have been prompted in order to account for variations in lighting conditions between the reference and comparison images.

- With regards to claims 6, 15, and 24, Dionysian in view of Kawakami et al. teach an image comparison system, and program according to claims 1, 10, and 19, respectively. Dionysian fails to teach a system, method and program characterized by further comprising: extracting a three-dimensional reference point from the input three-dimensional data; and obtaining a coordinate correspondence of a standard three-dimensional weighting

coefficient to the three-dimensional data by using a standard three-dimensional reference point corresponding to a standard three-dimensional object model and the three-dimensional reference point of the three-dimensional data, and converting the standard three-dimensional weighting coefficient into a two-dimensional weighting coefficient in accordance with the pose candidate, the step of performing comparison comprising the step of calculating one of the distance value and the similarity degree between the reference image and the comparison image by using the converted two-dimensional weighting coefficient. Roy et al. teach a system, method and program characterized by further comprising: extracting a three-dimensional reference point from the input three-dimensional data; (Roy et al., Column 12 Line 27 – Column 13 Line 12) and obtaining a coordinate correspondence of a standard three-dimensional weighting coefficient to the three-dimensional data by using a standard three-dimensional reference point corresponding to a standard three-dimensional object model and the three-dimensional reference point of the three-dimensional data, (Roy et al., Column 12 Line 27 – Column 13 Line 12) and converting the standard three-dimensional weighting coefficient into a two-dimensional weighting coefficient in accordance with the pose candidate, (Roy et al., Column 11 Lines 42 – 52, Column 12 Line 58 – Column 14 Line 7) the step of performing comparison

comprising the step of calculating one of the distance value and the similarity degree between the reference image and the comparison image by using the converted two-dimensional weighting coefficient. (Roy et al., Column 10 Line 34 – Column 11 Line 12) It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Dionysian in view of Kawakami et al. with the teachings of Roy et al. The modification would have been prompted in order to accurately map 3D correcting coefficients to the coefficients needed to correct the corresponding 2D image.

Response to Arguments

8. Applicant's arguments with respect to claim 1 - 27 have been considered but are moot in view of the new ground(s) of rejection.

9. Applicant's arguments filed 29 August 2008 have been fully considered but they are not persuasive. On pages 18 and 19 of the remarks Applicant's Representative argues that Dionysian fails to teach generating a pose candidate. The Examiner respectfully disagrees and asserts that Dionysian does in fact teach the generation of a pose candidate, see Dionysian Column 4 Lines 29 – 67 and Figs. 5a and 5b. Dionysian does in fact teach generating an image for pose comparison; see also Column 6 Lines 4 – 27.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ERIC RUSH whose telephone number is (571)270-3017. The examiner can normally be reached on 7:30AM - 5:00PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella can be reached on (571) 272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew C Bella/
Supervisory Patent Examiner, Art Unit 2624

ER